

V.D.R.L. TUBE TEST

A COMPARISON WITH THE KAHN AND KOLMER TESTS FOR SYPHILIS*

BY

AIDA Y. DJANIAN

From the Department of Bacteriology, School of Medicine, American University of Beirut, Lebanon

It has been said that the use of cardiolipin-lecithin-cholesterol antigens has rendered complement-fixation and flocculation reactions for syphilis more specific and sensitive than those carried out with other antigen preparations (Arnold and Mahoney, 1949; Bekierkunst and Milgrom, 1950; Blumberg and others, 1950; Brown, 1946; Cutler and Harris, 1951; Giordano and others, 1948; Harris and others, 1948a, b; Kahn, 1946; Kahn and McDermott, 1948; Kent and others, 1948; Kline, 1946; Mazzini, 1951; Rein and Bossak, 1946; Rosenberg and others, 1948; Victor and Hunter, 1949; Public Health Conference Boston, 1948).

This report concerns 8,228 sera tested in parallel using the V.D.R.L. tube flocculation test and the standard Kahn reaction in order to compare the sensitivity of the two tests. In addition, 746 of these sera were subjected to the Kolmer complement-fixation reaction. No attempt was made to evaluate specificity.

The sera used in this study were sent to this laboratory for routine Kahn tests over a period of 2 years. The sera were heated at 56°C. for 30 min. and subsequently reheated for 10 min. if they were not examined within 6 hours after the original inactivation. Kahn's standard test (Kahn, 1946) was employed.† Readings were recorded as four, three, two, and one plus on the basis of the distinctness of the precipitate as seen by means of an agglutinoscope (Fisher).

The V.D.R.L. qualitative tube test‡ was performed as described by Harris, Rosenberg, and Del Vecchio (1948b). Readings were recorded as positive when visible aggregates in a clear or slightly turbid fluid were observed, and negative when there were no visible aggregates and a silken swirl on gentle shaking was seen. These observations were made when the tubes were held in daylight against a dark background.

Kolmer's standard complement-fixation test‡ was employed. Positive results were recorded as four, three, two, and one plus based on the degree of haemolysis, complete haemolysis being reported as negative.

Comparing the V.D.R.L. tube test with the Kahn test there was complete agreement with 7,840 sera out of 8,228 (95.3 per cent.). An analysis of the results is set out in Tables I and II.

TABLE I
COMPARISON OF KAHN TESTS WITH V.D.R.L. TUBE TESTS ON 8,228 SERA

Test	Positive	Doubtful	Negative
V.D.R.L.	368	—	7,860
Kahn	470	239	7,519

TABLE II
ANALYSIS OF 388 SERA (TABLE I) GIVING CONFLICTING RESULTS

V.D.R.L.		Kahn		
		Positive	Doubtful	Negative
Positive	36	—	25	—
		—	—	11
Negative	352	138	214	—

Of the 388 sera in which results were not in agreement, 36 were positive with V.D.R.L., 25 of these being doubtful, and eleven negative with Kahn. Of the remaining 352 sera which were negative with the V.D.R.L., 138 were positive and 214 doubtful with Kahn (Table II).

On comparing the figures in Table I it will be seen that 102 more sera (1.2 per cent.) gave positive results with the Kahn when the 8,228 sera were tested in parallel. If the doubtful Kahn reactions are regarded as positive, then the increased positive serology rate rises to 341 positive sera (4.1 per cent.).

* Received for publication April 30, 1953.

† Both antigens supplied by Lederle.

‡ Antigen supplied by Difco.

When 746 of the sera were tested in parallel with the V.D.R.L., Kahn, and Kolmer tests, there was total agreement with 608 sera (81.5 per cent.) and disagreement with 138 (Table III).

TABLE III
COMPARISON OF KAHN TESTS, V.D.R.L. TUBE TESTS,
AND KOLMER TESTS ON 746 SERA

V.D.R.L.		Kolmer		Kahn	
		Positive	Negative	Positive	Negative
Positive	191 (25.6%)	162	29	188	3
Negative	555	37	518	109	446
Totals	746	199 (26.7%)	547	297 (39.8%)	449

Of the 138 sera with which the three tests gave discordant results, 29 were positive with the V.D.R.L. and negative with the Kolmer. Three sera of the same group were recorded as negative with Kahn. The remainder (109) failed to react with V.D.R.L. but were positive with Kahn. 37 sera from this group were reported as positive with Kolmer.

This analysis shows that, when the sensitivity of these three tests with the 746 sera used is compared, the order is as shown in Table IV.

TABLE IV
COMPARISON OF KAHN, V.D.R.L., AND KOLMER TESTS
SHOWING ORDER OF SENSITIVITY

Test	Positive	Percentage
Kahn	297	39.8
Kolmer	199	26.7
V.D.R.L.	191	25.6

When the increased sensitivity rates of this group of sera (746) are compared with those of Table I,

due allowance must be made for the fact that the latter (8,224) contained approximately thirteen times the number of negative and only twice the number of positive sera. When this is done, as might be expected, the increased sensitivity rate of the Kahn as against the V.D.R.L. is similar, whilst there seems to be no significant difference between the V.D.R.L. and the Kolmer complement-fixation test.

The writer wishes to thank Dr. K. S. Krikorian, Director of the Hospital Laboratories, Dr. D. Waggoner, Bio-Statistician, for his help with the interpretation of the results, Dr. R. M. Dowdeswell, Professor of Bacteriology, for his assistance in the preparation of the paper for publication, and Mr. G. Apardian, for his technical assistance.

REFERENCES

- Arnold, R. C., and Mahoney, J. F. (1949). *J. vener. Dis. Inf.*, **30**, 217.
 Bekierkunst, A., and Milgrom, F. (1950). *Bull. World Hlth Org.*, **2**, 687.
 Blumberg, J. M., Hartney, J. B., and Dimmock, M. O. (1950). *Amer. J. clin. Path.*, **20**, 367.
 Brown, R. (1946). *J. Immunol.*, **52**, 17.
 Cutler, J. C., and Harris, A. (1951). *J. vener. Dis. Inf.*, **32**, 328.
 Giordano, A. S., Culbertson, C. S., and Higginbotham, M. W. (1948). *Amer. J. clin. Path.*, **18**, 193.
 Harris, A., Rosenberg, A. A., and Del Vecchio, E. R. (1948a). *J. vener. Dis. Inf.*, **29**, 72.
 ———, ——— (1948b). *Ibid.*, **29**, 313.
 Kahn, R. L. (1946). "Technique of the Standard Kahn Test and of Special Kahn Procedures", ref. ed. University of Michigan Press, Ann Arbor, Mich., U.S.A.
 ———, and McDermott, E. B. (1948). *Amer. J. clin. Path.*, **18**, 364.
 Kent, J. F., Boyd, H. M., and Sanders, R. W. (1948). *Bull. U.S. Army med. Dept.*, **8**, 284.
 Kline, B. S. (1946). *Amer. J. clin. Path.*, **16**, 68.
 Mazzini, L. Y. (1951). *J. Immunol.*, **66**, 261.
 Rein, C. R., and Bossak, H. N. (1946). *Amer. J. Syph.*, **30**, 40.
 "Report on the Preliminary Study of the Adaptability of Antigens containing Cardioliipin," presented at the Conference of State and Provincial Public Health Laboratory Directors, Boston, Mass. Nov. 8, 1948.
 Rosenberg, A. A., Harris, A., and Harding, V. L. (1948). *J. vener. Dis. Inf.*, **29**, 359.
 Victor, F. M., and Hunter, C. A. (1949). *Ibid.*, **30**, 347.